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(54) Title: SYSTEM AND METHOD FOR CONSTRUCTING A COMPOSITE SMS MESSAGE FROM MULTIPLE SMS MESSAGES
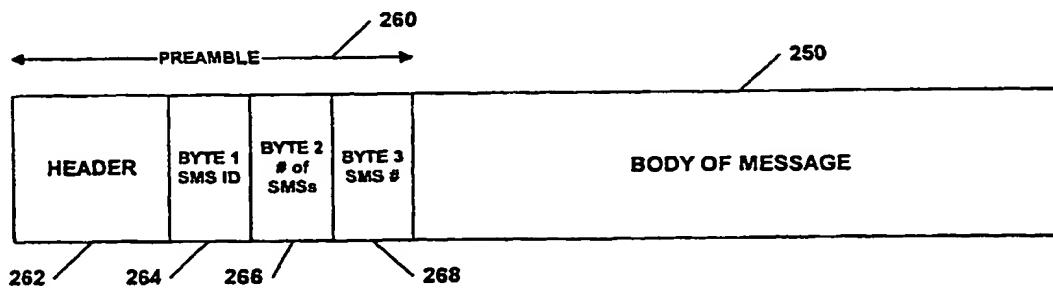
(57) Abstract: A method of constructing a composite message from multiple SMS messages in a wireless communication system. The method uses a novel SMS message format including a message body (250) and a preamble (260) preceding the message body. The preamble has a header (262) indicating that the current message is a constituent portion of a composite SMS message. The preamble also has a first byte (264) comprising an SMS message ID number, a second byte (266) indicating the total number of constituent message portions of the composite SMS message, and a third byte (268) indicating the position of the current message within the composite SMS message.

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SYSTEM AND METHOD FOR CONSTRUCTING A COMPOSITE SMS MESSAGE FROM MULTIPLE SMS MESSAGES

Field of the Invention

5   The present invention relates generally to radio or wireless communications and, more particularly, relates to a method by which a wireless communication device constructs a composite SMS message from multiple SMS messages it receives.

Background of the Invention

10   The advent of wireless personal communications devices has revolutionized the telecommunications industry. Cellular, PCS and other services provide wireless personal communications to businesses and individuals at home, in the office, on the road, and any other locations the wireless network reaches. Wireless telephone subscribers no longer have to use pay telephones along the road, or wait until they return home or to the office to

15   check messages and return important business calls. Instead, wireless subscribers carry out their day to day business from their cars, from the jobsite, while walking along the airport concourse, and just about anywhere their signals are accessible.

Thus, it is no surprise that since the introduction of the cellular telephone service, the number of wireless telephone subscribers has increased steadily. Today, the number of

20   wireless telephone subscribers is staggering and still growing rapidly. In fact, many households have multiple wireless telephones in addition to their conventional land-line services.

With a market of this size, there is fierce competition among hardware manufacturers and service providers. In an attempt to lure customers, most providers offer

25   handsets with desirable features or attributes such as small size, light weight, longer battery life, speed dial, and so forth. Many recent additions to the marketplace include

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multi-functional handsets that even provide pocket-organizer functions integrated into the wireless handset. Most manufacturers, however, are still scrambling to add new features to their communication devices to snare a portion of this booming market.

Wireless handsets are often configured to send and receive text messages in SMS (Short Message Service) format, which is a well-known standard for wireless transmission of short messages. The message can comprise letters, numbers or an alphanumeric combination, and typically has a maximum character length. Typically the SMS messages may be sent and received simultaneously with voice or data calls.

Reference is made to U.S. patent application serial no. 09/399,376, entitled "System and Method for Attaching an Advertisement to an SMS Message for Wireless Transmission", which is of common assignee and was filed on even date with the present application. This application, which is incorporated by reference, is exemplary of the possible uses for SMS messaging in a wireless context. Based on a monitoring request from a wireless device, when certain conditions are met, a remote server generates an SMS alert message and appends an advertisement in the remaining SMS message space not occupied by the alert message.

The above application is also exemplary of the limitations and drawbacks of SMS messaging. The primary drawbacks are the limitations on the format and size of the SMS message. SMS messages are formatted as 7-bit ASCII strings, and are typically limited to a size or length of 100-255 characters. The precise limit depends on the wireless service provider. Due to these limitations, in the above application, both the alert message and appended advertisement must be fit within the maximum length of an SMS message (if both are to be part of a continuous and uninterrupted user display). If the advertisement cannot fit in the available space, it cannot be appended to the alert message.

The SMS message length limitation has thus far not been a significant drawback in the wireless arena, as conventional wireless devices typically have small display areas or screens and cannot display longer messages in any event. As wireless devices are developed having larger displays, however, the capability to display longer messages is

5   becoming more desirable. One example of a wireless device having a larger display area is the "Neopoint 1000" wireless device developed by the present assignee. For such devices, the SMS message length limitation is a serious and substantial drawback.

Summary of the Invention

10   The present invention provides a system and method for constructing a composite SMS message from multiple SMS messages, each of which is a constituent portion of the composite message.

In one embodiment of the invention, an SMS message format for a wireless communication system is provided. The format comprises a message body, and a

15   preamble preceding the message body. The preamble includes a header indicating that current message is a constituent portion of a composite SMS message. The preamble also includes a first byte comprising an SMS message ID number, a second byte indicating the total number of constituent portions of the composite SMS message, and a third byte indicating the position of the current message within the composite SMS message.

20   In another embodiment of the present invention, a method for constructing a composite SMS message from multiple SMS messages having a format as set forth above is provided. The method comprises the following steps:

receiving a current SMS message;

determining whether the current message is a constituent portion of the composite

25   message, and if it is not, alerting a user that the current message is waiting;

if the current message is a constituent portion of the composite message, determining whether there are more than one constituent portion of the composite message, and if there are not, alerting the user that the current message is waiting;

if there is more than one constituent portion of the composite message, determining

5   whether previous constituent portions have been received, and if previous constituent portions have not been received, storing the current message in local memory as the first constituent portion of the composite message and waiting for a next constituent portion;

if previous constituent portions have been received, verifying that the ID numbers of the previous constituent portion and the current message match, and if the ID numbers

10   of the previous constituent portion and the current message do not match, storing the current message in local memory as the first constituent portion of a new composite message and waiting for the next constituent portion;

if the ID numbers of the previous constituent portion and the current message match, determining whether the current message is the final constituent portion of the

15   composite message, and if it is not, storing the current message in local memory and waiting for the next constituent portion of the composite memory; and

if the current message is the final constituent portion of the composite message, assembling the composite message from the stored constituent portions in local memory and alerting the user that a composite message has been received.

20   Objects and advantages of the present invention include any of the foregoing, singly or in combination. Further objects and advantages will be apparent to those of ordinary skill in the art, or will be set forth in the following disclosure.

Brief Description of the Drawings

The present invention is described with reference to the accompanying drawings. In the drawings, like reference numbers indicate identical or functionally similar elements,

5   and

Figure 1 is a diagram illustrating an example wireless communication device.

Figure 2 is a block diagram of a wireless communication system.

Figure 3 is a flowchart illustrating a method for requesting information across a wireless network.

10   Figure 4 is a block diagram illustrating a processor-based system.

Figure 5 is a diagram of an SMS message and preamble format according to the present invention.

Figure 6 is a diagram of an SMS message and preamble format with exemplary header and byte values.

15   Figure 7 is a flowchart illustrating a method of constructing a composite SMS message from multiple SMS message.

Detailed Description of Preferred Embodiments

1.   Example Environment

20   Before describing the invention in detail, it is useful to describe an example environment in which the invention can be implemented. One example environment is a handset or communication device operating within a wireless communication network such as, for example, a cellular, GSM, PCS or radio communication network. Wireless communication devices embodying the present invention can be implemented in various

25   configurations and architectures. Typically, a wireless communication device will include

a keypad for control of the device and data entry, and a display for displaying relevant information.

An example wireless communication device 100 is illustrated in **Figure 1.** Communication device 100 is presented for illustrative purposes only; implementation of the invention is not dependent on any particular device architecture or communication network.

Device 100 includes a processor 104, a speaker 106, a display 108, a keypad 110, a transceiver 122, a memory 114, a microphone 116, a power source 118 and an antenna 120. Device 100 is typically a mobile device such as a handheld handset or an integrated vehicle phone. It is configured to communicate with other communications devices such as base station 112. Base station 112 is typically within a geographic area known as a "cell" and handles communications for all wireless devices within the cell.

Processor 104 directs the overall operation of device 100. A computer program or set of instructions is typically coded or otherwise implemented on the processor to enable the processor to carry out the device operation. Memory 114 interfaces with processor 104 and may store program code and provide storage space for data useful in executing the program code and carrying out the device functions. Memory 114 may be implemented as ROM, RAM or any other convenient memory format. The features and functionality of the invention described below may be implemented using hardware, software, or a combination thereof, and such software can run on a processor such as processor 104 and be stored in a memory such as memory 114.

Transceiver 112 includes a transmitter that transmits voice and data information via antenna 120 to a recipient communication device such as, for example, base station 112. Transceiver 112 also includes a receiver that receives voice and data information

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from another communication device (e.g., base station 112). The received voice and data information is provided to the user or used to facilitate device operation.

User interface features include speaker 106, display 108, keypad 110, and microphone 116. Microphone 116 accepts voice or other audio information from the user

5   and converts this information into electrical signals that can be transmitted by transceiver 122. Likewise, speaker 106 converts electrical signals received by transceiver 122 into audio information that can be heard by a user of device 100. Display 108 displays information such as call information, keypad entry information, signal presence and strength information, battery life information, or any other information useful to the user.

10   Display 108 preferably takes the form of a liquid crystal display (LCD), which have low power consumption characteristics, but could also be implemented as a light emitting diode (LED) display or any other appropriate visual indicator. Keypad 110 typically includes an alphanumeric keypad and may also include special function keys. In one embodiment, keypad 110 is backlit to permit viewing of the keys in low light or dark

15   conditions. Device 100 may also include a flip panel (not shown) that can be closed to conceal some or all of the keypad.

Power source 118 is provides power to device 100. It can be implemented with rechargeable batteries, such as NiCad or NiMH rechargeable batteries, or with any other suitable power source.

20   **Figure 2** is a block diagram illustrating a wireless communication system including a wireless handset 130 and a hands-free unit 132. Handset 130 can be implemented in a configuration such as device 100 of **Figure 1**, or in any other wireless communication device capable of communicating with remote locations via a wireless communication medium. In the description below, "handset" refers to any communication

25   device capable of communicating with other devices via a wireless medium.

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Hands-free unit 132 is optionally provided to allow the user of wireless device 130 to communicate in a hands-free mode. Hands-free unit 132 may include a microphone and speaker to provide wireless device 130 with speakerphone-like capabilities. Such capabilities are particularly desirable where wireless device 130 is utilized in an

5   automobile or other mobile situation. In one implementation, hands-free unit 132 is configured according to conventional industry standards for a "hands-free kit". In addition to the conventional standards, hands-free unit 132 may be equipped with a position determination system 134 to determine the location of unit 132 and handset 130. Position determination system 134 may be implemented using a GPS (global positioning system),

10   the design and configuration of which is well known to those of ordinary skill in the art.

Wireless device 130 preferably includes both a voice and data interface, particularly where position determination system 134 is incorporated in a hands-free unit 132. The voice interface provides hands-free operation and speakerphone-like capabilities. The data interface allows position information obtained by system 134 to be

15   provided to handset 130 for transmission over wireless network 140.

Handset 130 communicates with other entities via wireless network 140. Network 140 is typically comprised of a plurality of base stations, such as base station 112 of Figure 1, that provide relay points for communication. Network 140 may be a cellular, PCS, GSM, or any other wireless communication network. In addition to conventional

20   communication with other wired or wireless communication devices, as shown in Figure 2, network 140 permits communication between handset 130 and server(s) 136.

A method for requesting information across network 140 is illustrated in Figure 3. In step 202, a user initiates a request for information. As described above, this request can be made via a keypad entry or by voice command with an appropriate voice recognition

25   system. In step 204, the system determines whether the request requires the handset

location or position. If position information is required, the method proceeds from step 204 to step 212, where position determination device 134 acquires the position of handset 130. If position information is not required, the method proceeds from step 204 directly to step 206.

5   In step 206, handset 130 sends the request to server 136 via wireless network 140. The request includes any position data acquired in steps 212-214. In step 208, server 136 retrieves the data or information requested from database 138. The data is communicated to handset 130 over network 140 and, in step 210, is displayed or provided to the user.

The wireless communication device and system described above may be 10   implemented with hardware, software or a combination thereof and may be implemented using a computing system having one or more processors. In one embodiment, it is implemented as a processor-based system. An example processor-based system 502 is shown in **Figure** 4. All or some of the elements of system 502 may be employed in both server 136 and wireless handset 130 to provide the functionality described herein. System 15   502 includes one or more processors, such as processor 504. Processor 504 is connected to communication bus 506.

System 502 also includes main memory 508 and secondary memory 510. Main memory 508 is preferably random access memory (RAM), and secondary memory 510 preferably includes hard disk drive 512 and/or a removable storage drive 514. Removable 20   storage drive 514 is typically a floppy disk drive, a magnetic tape drive, an optical disk drive or the like. Storage drive 514 reads from and writes to removable storage media 518 in a well-known manner. Storage media 518 is typically a floppy disk, magnetic tape, optical disk or the like having stored therein computer software and/or data.

Secondary memory 510 may include additional or alternative means for allowing 25   computer programs or other instructions to be loaded into computer system 502. A

removable storage unit 522 and interface 520, for example, may be provided. Interface

520 and storage unit 522 could take the form of a program cartridge and cartridge interface

(such as that found in video game devices), or a removable memory chip (such as an

EPROM, or PROM) and associated socket.

5   Communications interface 524 allows software and data to be transferred between

computer system 502 and external devices. Examples of communications interface 524

include a modem, a network interface (such as, for example, an Ethernet card), a

communications port, or a PCMCIA slot and card. Software and data is transferred via

communications interface 524 as electronic, electromagnetic, optical or other signals

10   capable of being received by communications interface 524. These signals are provided to

communications interface via channel 528. Channel 528 carries signals and can be

implemented as a wireless medium, wire or cable, fiber optics, or other communications

medium. Examples include a phone line, a cellular phone link, an RF link or a network

interface.

15   In this document, the terms "computer program medium" and "computer usable

medium" refer generally to media such as removable storage device 518, a disk capable of

installation in disk drive 512, and signals on channel 528. These computer program

products are means for providing software or program instructions to computer system

502. Computer programs (also called computer control logic) are stored in main memory

20   and/or secondary memory 510. Computer programs can also be received via

communications interface 524. Such computer programs, when executed, enable the

computer system 502 to perform the features of the present invention as discussed herein.

In particular, the computer programs, when executed, enable the processor 504 to perform

the features of the present invention. Accordingly, such computer programs represent

25   controllers of the computer system 502.

In an embodiment where the elements of the invention are implemented using software, the software may be stored in, or transmitted via, a computer program product and loaded into computer system 502 using removable storage drive 514, hard drive 512 or communications interface 524. The control logic (software), when executed by the

5   processor 504, causes processor 504 to perform the functions of the invention as described herein.

In another embodiment, the elements are implemented primarily in hardware using components such as PALs, application specific integrated circuits (ASICs) or other hardware components. Implementation of a hardware state machine to perform the

10 functions described herein will be apparent to persons skilled in the relevant art(s). In yet another embodiment, elements are implemented using a combination of both hardware and software.

2.   A Method for Constructing a Composite SMS Message from Multiple SMS Messages

15   Handset 130 and server 136, and other communication devices in the network, may be configured to send and receive text messages in SMS (Short Message Service) format, which is a well-known standard for wireless transmission of short messages. An SMS message may comprise letters, numbers or an alphanumeric combination. Typically the SMS messages may be sent and received simultaneously with voice or data calls.

20   The primary drawbacks of SMS messaging are the limitations on the format and size of the SMS message. SMS messages are formatted as 7-bit ASCII strings, and are typically limited to a size or length of 100-255 characters. For wireless devices having sufficiently large display areas, the capability to display longer messages is desirable. One example of a wireless device having a larger display area is the "Neopoint 1000" wireless

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device developed by the present assignee. For such devices, the SMS message length

limitation is a serious and substantial drawback.

The present invention provides a method for constructing a composite SMS

message from multiple SMS messages, and a novel SMS message and preamble format

5   for use in conjunction with the method. First, the message and preamble format will be

described with reference to **Figures 5 and 6**. As indicated in **Figure 5**, the SMS message

format consists of message body 250 and a preamble 260 that precedes message body 250.

Message body 250 contains the actual text of the SMS message and, under the present

invention, may be a portion of a larger, composite message. Preamble 260 informs the

10   wireless device (or server, PC or other communication devices) that message body 250 is

part of a larger, composite message.

Preamble 260 consists of a header 262 and three bytes 264, 266 and 268 following

the header. Header 262 is a string of characters indicating that a specially formatted SMS

message is to follow. The first byte following header 262, byte 1, is a numeric character

15   in the range of 0-9 that serves as the ID number, or SMS ID, of the SMS message. All

SMS messages that are part of a composite message will share the same ID number.

Hence, if consecutive messages are received with the same SMS ID, the device will know

that they are part of one composite message. Conversely, if messages are received having

different ID numbers, the messages are not part of one composite. Byte 2 (266) is a

20   numeric character in the range of 1-9 that indicates the total number of SMSs contained

within this composite message. Byte 3 (268) is a numeric character in the range of 1-9

indicating the particular number of this SMS message within the composite message.

Figure 6 depicts the preamble and message format described above with

exemplary header and byte values. The preamble is "//NP", indicating that a specially

25   formatted SMS message of the assignee (Neopoint, Inc.) is to follow. Byte 1 has a value

of 3. This indicates that the SMS ID number of this message is 3, and that adjacent messages also having a value of 3 are part of one composite message. If, for example, the next message had an SMS ID number of 7, it would indicate that the next message is not part of the composite message. Byte 2 has a value of 2. This indicates that the total

5   number of SMS messages contained within this composite message is two. Byte 3 has a value of 1. This indicates that this message is the first of the two messages forming the composite message.

In the example shown in **Figure 6**, the next SMS message received (assuming no errors or corruption) would have the preamble '//NP322'. This indicates that the message

10   is a specially formatted message (header), has an SMS ID number 3 (byte 1), is part of a composite message comprised of two SMS messages (byte 2), and is the second of the two messages (byte 3).

Figure 7 depicts a method for identifying messages of the type shown in **Figures 5-6** and constructing a composite SMS message from those messages. As described above

15   with reference to **Figure 4**, the method steps may be implemented in a wireless handset, such as handset 130 of **Figure 2**, as computer programs, software or hardware. The portions relating to control of handset 130 may be coded in processor 104 or could be stored in memory 114. Alternatively, the program or portions of it could be stored on server 136 and downloaded to handset 130 as needed. Portions relating to the steps

20   carried out by server 136 preferably reside in a processor or memory in server 136.

At step 302, the wireless handset waits to receive an SMS message. This may be a rest or monitoring mode in which the handset is waiting to receive a voice or data call. A server, computer or other communication device could also receive the SMS message. The handset remains in this mode until a message is received. When a message is

25   received (decision node 304), the method proceeds to decision node 306. At decision

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node 306, the header of the message is examined to determine if it indicates a specially formatted SMS message. As described above, the header '//NP' is one example of a header that might be used to indicate that the message is part of a composite SMS message.

5   If the header is not '//NP' (or any other appropriate header), indicating that the received SMS message is not a part of a composite SMS message, the method proceeds to step 320. At step 320, a waiting bit or register is set to off. The waiting bit is a bit that indicates whether the handset is waiting for another individual SMS message that forms a part of a composite SMS message. Since, at node 306, it was determined that the message

10   is not a part of a composite SMS message, the handset is not waiting for a portion of a composite message and the waiting bit is turned off. Another bit or register, S_SMSID, which is the stored SMS ID number, is set to zero. From step 320, the method proceeds to step 322. An appropriate alert message or display is generated to signal the user that a message has arrived. The user may then make the appropriate key press or menu selection

15   to display the message (which was not a composite SMS message).

If, at node 306, it is determined that the header is '//NP' (i.e., the header indicates that this SMS message is part of a composite SMS message), the method proceeds to decision node 308. At node 308, the method looks at the second byte of the preamble (reference 266 of **Figure 5**) to determine whether the number of constituent SMS

20   messages making up the composite SMS message is greater than one. If it is not (i.e., if byte 2 is one), indicating that the received message is the only portion of the composite message, the method proceeds to step 320 as described above (waiting bit turned off, SMS ID set to zero, and user alerted to the message). If the second preamble byte is greater than one, indicating that there is more that the composite message is comprised of more

25   than one constituent messages, the method proceeds to decision node 310.

15

At node 310, it is determined whether the waiting bit is on. As described above, the status of the waiting bit indicates whether the handset is waiting for more constituent messages that form a part of the composite message. If the waiting bit is not on, indicating that the received message is the first in the series of constituent messages, the method

5   proceeds to step 324. The waiting bit is turned on, indicating that more SMS messages are to come (per the determination made at node 308). The stored SMS ID number is set to the received SMS ID number in the first byte (S_SMSID=R_SMSID) in order to permit a verification that later messages are part of the same composite message (i.e., that they have the same ID number). Finally, the bit S_COUNT is set to one. S_COUNT tracks the

10   current number of the received SMS message. Since the waiting bit was off (node 310), this is the first SMS message and S_COUNT is set to one. From step 324, the method proceeds to step 326. The received SMS message is stored in local memory and the method returns to step 302 to wait for the next constituent message which forms a part of the composite SMS message.

15   If at node 310 it is determined that the waiting bit was on, indicating that the handset has already received at least one constituent message and is waiting for the next constituent message, the method proceeds to decision node 312. At node 312, the handset checks to see whether the stored SMS ID number (S_SMSID) is equal to the received SMS ID number in the first byte of the current message (R_SMSID). This is essentially a

20   confirmation that the current message has the same ID number, and is thus part of the same composite message, as the previously received message. If the ID numbers do not match, the method assumes that the current message is a new or different message. The previous message may have been corrupted or incomplete. The method proceeds to step 324 and proceeds as if the current message is the first constituent message of a new

:

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composite SMS message. The waiting bit is turned on, the stored message ID number is reset to the received message ID number, and the message count is set to one.

If at node 312 the stored SMS ID matches the received SMS ID, indicating that the current message is part of the same composite message as the previous message, the

5   method proceeds to step 314. At step 314, the S_COUNT bit is increased by 1. As noted above, S_COUNT tracks the current number of the received SMS message. Since the checks at steps 306, 308, 310 and 312 have indicated that the current message is a constituent message within a composite SMS message, and that the current message is not the first constituent portion, it is appropriate to increase the message count by one.

10   The method then proceeds to decision node 316, where it is determined whether the current message number (S_COUNT) is equal to the total number of constituent SMS messages (i.e., the value of byte 2). If the current message number does not equal the total number, indicating that there are more constituent messages to come, the method proceeds to step 326. The current message is stored in local memory and the method proceeds to

15   step 302 to wait for the next constituent message. If the current message number is equal to the total number of messages, indicating that the current message is the last constituent message of the composite message, then the method proceeds to step 318. At step 318, the composite message is assembled from the constituent messages that have been stored in local memory (step 326).

20   Once the composite message has been assembled from the stored constituent messages, the method proceeds to step 320. Since the composite message is complete, the waiting bit is turned off. The stored SMS ID number is also reset to zero. At step 322, the user is alerted that the composite SMS message has been received. The method then returns to the waiting or monitoring step 302 to monitor for the next SMS message.

While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments, but should be defined only in

5   accordance with the following claims and their equivalents.

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Claims

1.   An SMS message format for a wireless communication system comprising:

a message body;

a preamble preceding the message body and having a header indicating that the

5   current message is a constituent portion of a composite SMS message, a first byte comprising an SMS message ID number, a second byte indicating the total number of constituent message portions of the composite SMS message, and a third byte indicating the position of the current message within the composite SMS message.

10   2.   An SMS message format as claimed in claim 1, wherein the first byte is a number in the range of 0-9, the second byte is a number in the range of 1-9, and the third byte is a number in the range of 1-9.

3.   A method for constructing a composite SMS message from multiple SMS

15   messages comprising:

receiving a current SMS message;

determining whether the current message is a constituent portion of the composite message, and if it is not, alerting a user that the current message is waiting;

if the current message is a constituent portion of the composite message,

20   determining whether there are more than one constituent portion of the composite message, and if there are not, alerting the user that the current message is waiting;

if there is more than one constituent portion of the composite message, determining whether previous constituent portions have been received, and if previous constituent portions have not been received, storing the current message in local memory as the first

25   constituent portion of the composite message and waiting for a next constituent portion;

if previous constituent portions have been received, verifying that the ID numbers of the previous constituent portion and the current message match, and if the ID numbers of the previous constituent portion and the current message do not match, storing the current message in local memory as the first constituent portion of a new composite

5   message and waiting for the next constituent portion;

if the ID numbers of the previous constituent portion and the current message match, determining whether the current message is the final constituent portion of the composite message, and if it is not, storing the current message in local memory and waiting for the next constituent portion of the composite memory; and

10   if the current message is the final constituent portion of the composite message, assembling the composite message from the stored constituent portions in local memory and alerting the user that a composite message has been received.


4.   A method as claimed in claim 3, wherein the method is performed by a

15   wireless communication device that receives the SMS messages over a wireless network.

5.   A method as claimed in claim 4, wherein the SMS messages have a format comprising:

a message body; and

20   a preamble preceding the message body and having a header indicating that the current message is a constituent portion of a composite SMS message, a first byte comprising an SMS message ID number, a second byte indicating the total number of constituent message portions of the composite SMS message, and a third byte indicating the position of the current message within the composite SMS message.

BASE STATION
112

120

100

PROCESSOR
104

SPEAKER
106

TRANSCEIVER
122

DISPLAY
108

MEMORY
114

KEYPAD
110

MICROPHONE
116

POWER SOURCE 118

Fig. 1

Fig. 2

```
┌─────────────────────────────────────────────┐  ⌐202
│         USER REQUESTS FEATURE                 │
└─────────────────────────────────────────────┘
                    │
                    ▼
            ◇ FEATURE          ⌐204
            REQUIRES POSITION ◇─────────────┐
              ?                          YES  212
                    │                         ▼
                    │               ┌──────────────────┐
                    │               │ ACQUIRE POSITION │
                    │               └──────────────────┘
                  NO                         │  ⌐214
                    │               ┌──────────────────┐
                    │               │ SEND POSITION DATA TO │
                    │               │       HANDSET    │
                    │               └──────────────────┘
                    ▼
┌─────────────────────────────────────────────┐  ⌐206
│         SEND REQUEST TO SERVER                │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐  ⌐208
│  SERVER LOOKS UP DATA/INFORMATION             │
│      AND RETURNS TO HANDSET                   │
└─────────────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────┐  ⌐210
│       PROVIDE INFORMATION TO USER             │
└─────────────────────────────────────────────┘
```

222

Fig. 3

PROCESSOR
504

502

MAIN MEMORY
508

SECONDARY
MEMORY
510

HARD DISK DRIVE
512

REMOVABLE
STORAGE DRIVE
514

REMOVABLE
STORAGE MEDIA
518

REMOVABLE
STORAGE UNIT I/F
520

REMOVABLE
STORAGE UNIT
522

BUS
506

COMMUNICATIONS
INTERFACE
524

CHANNEL 528
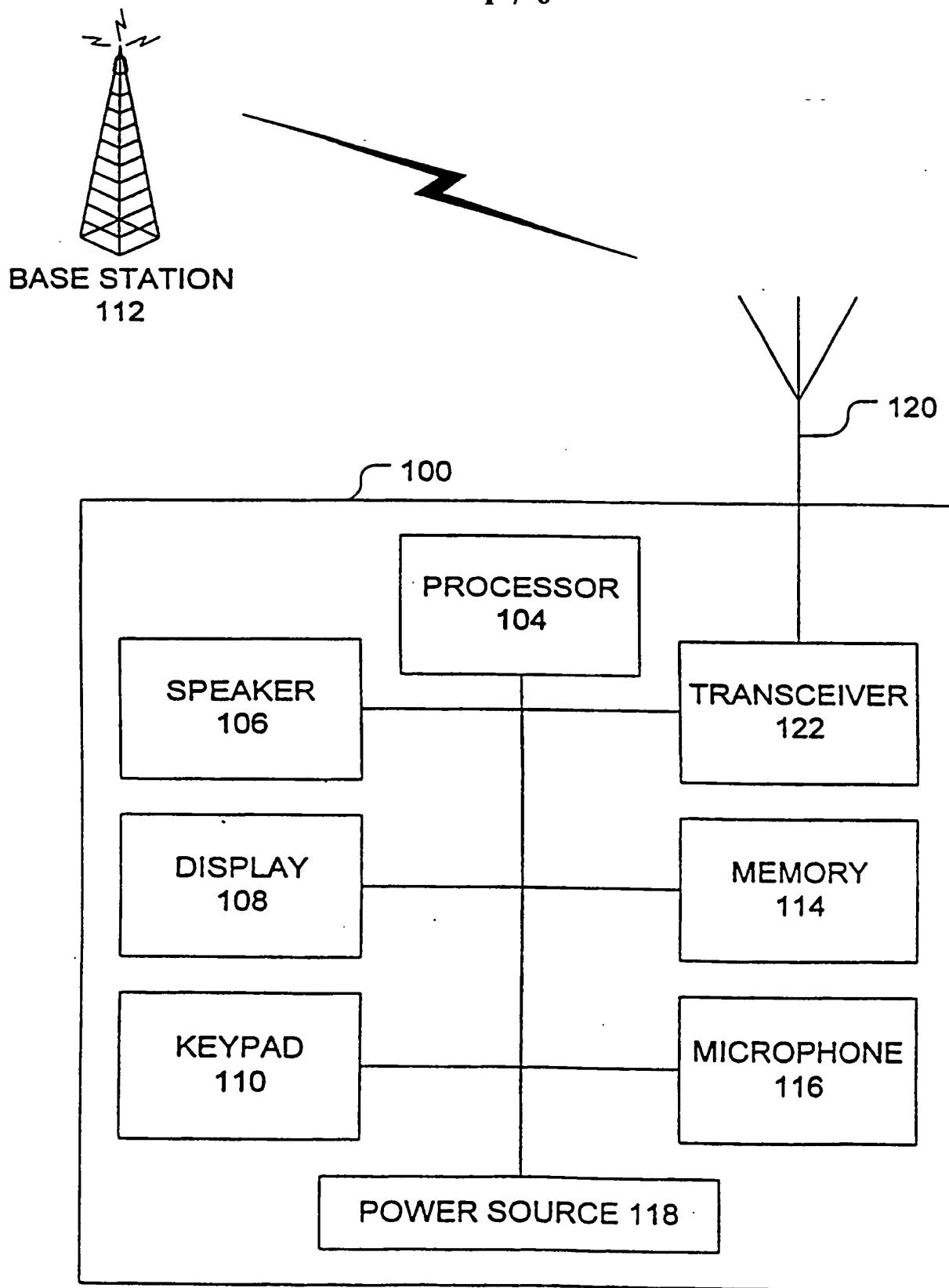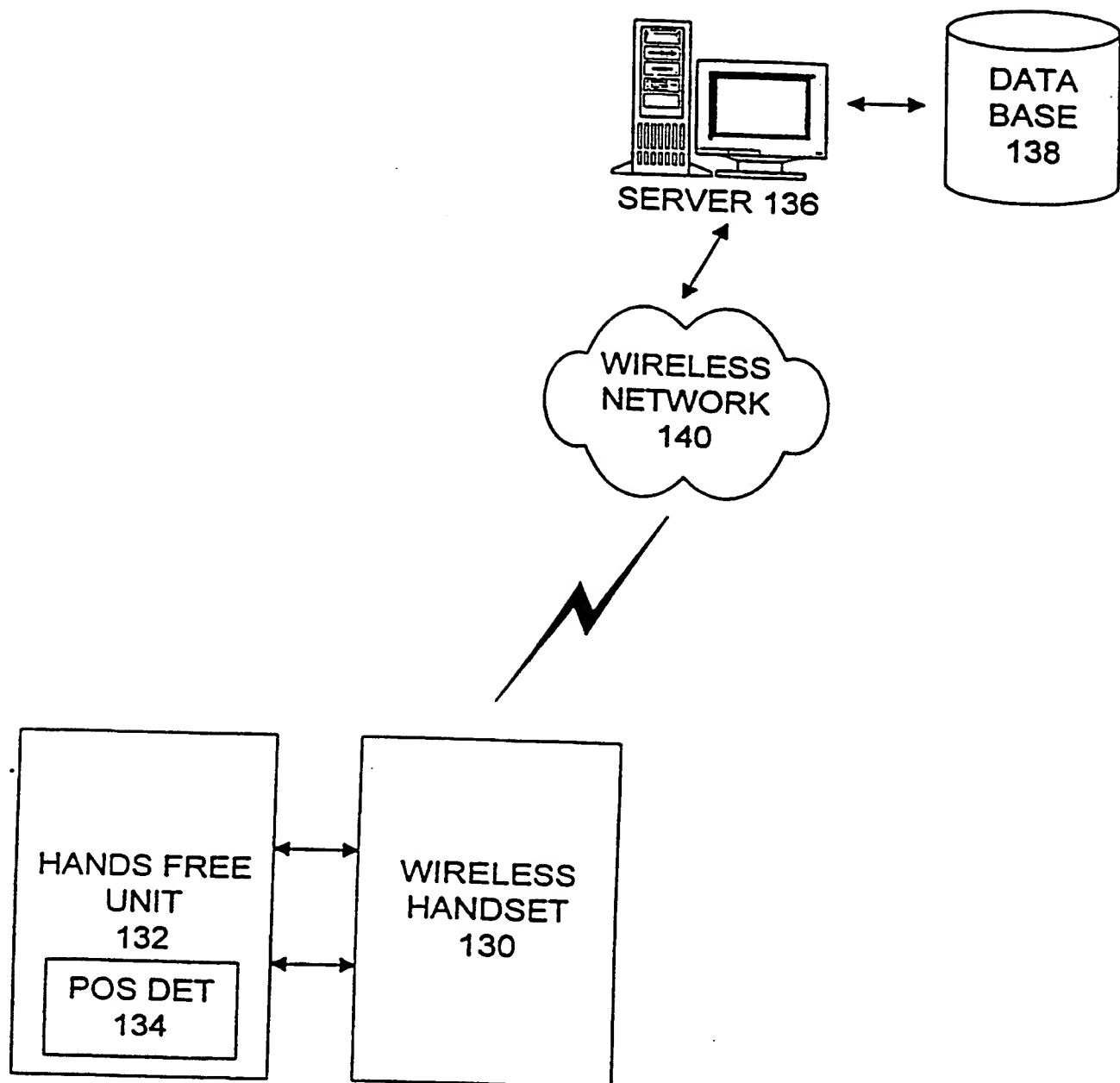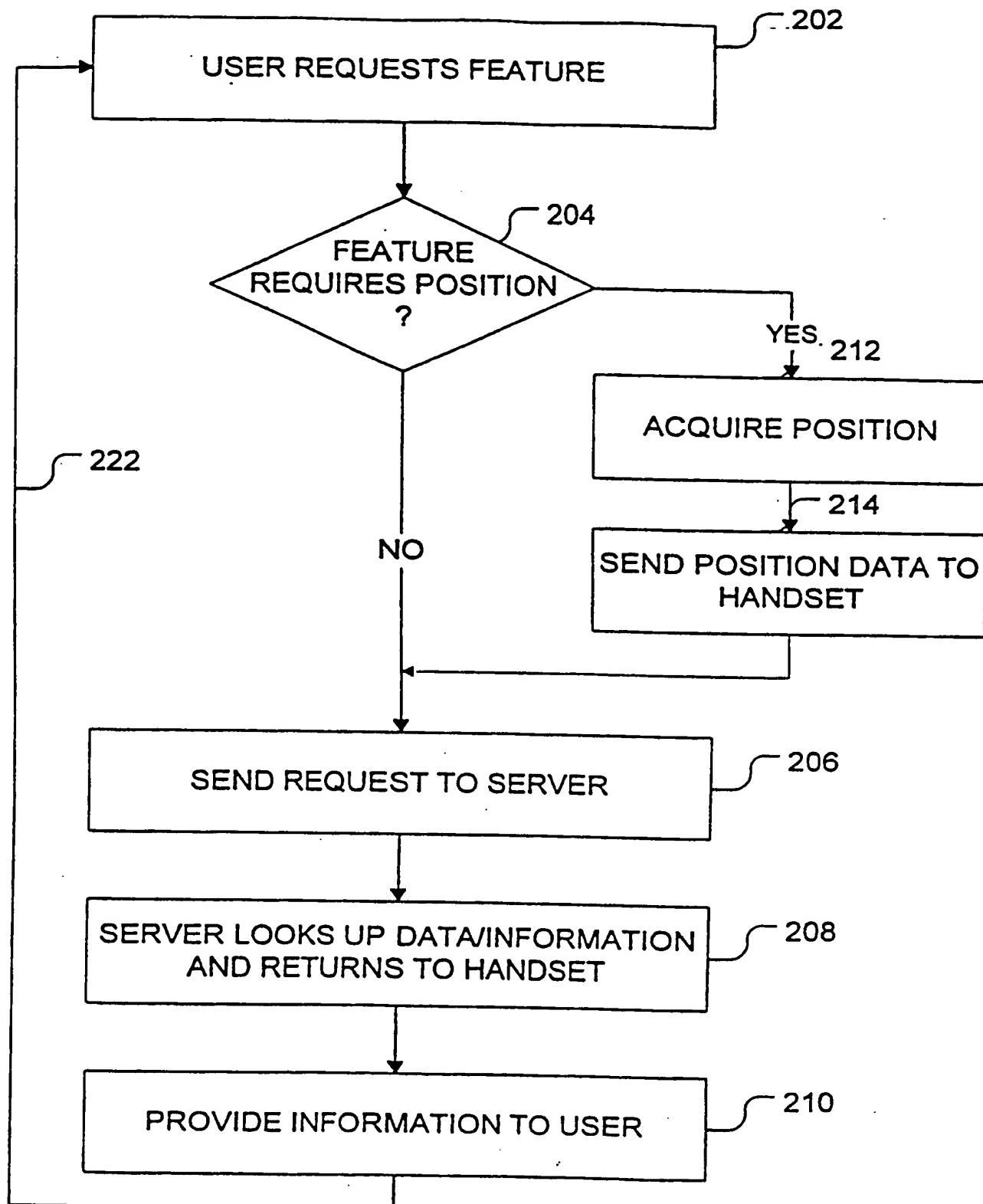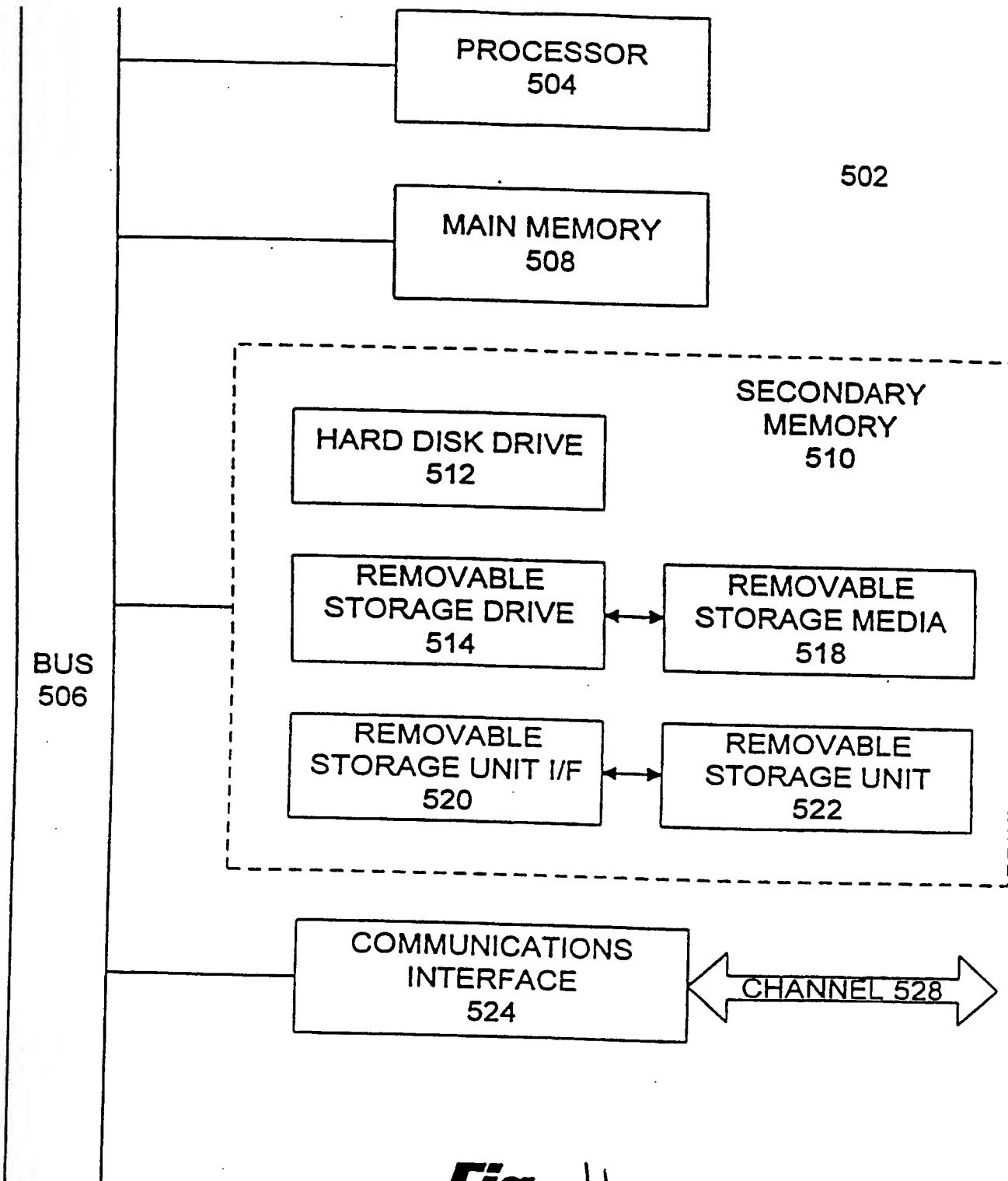
Fig. 4
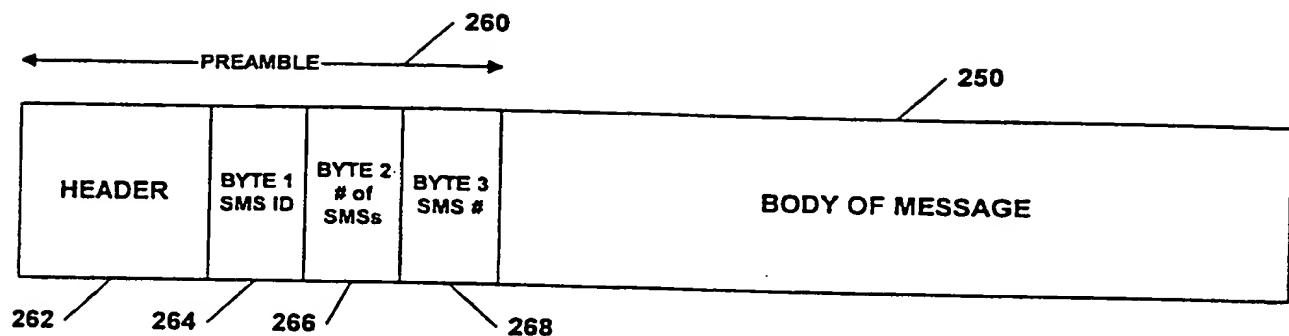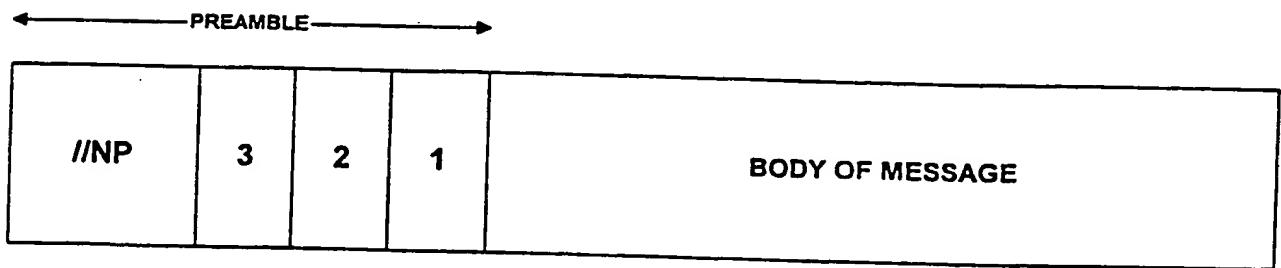
Figure 5

Figure 6

Figure 7
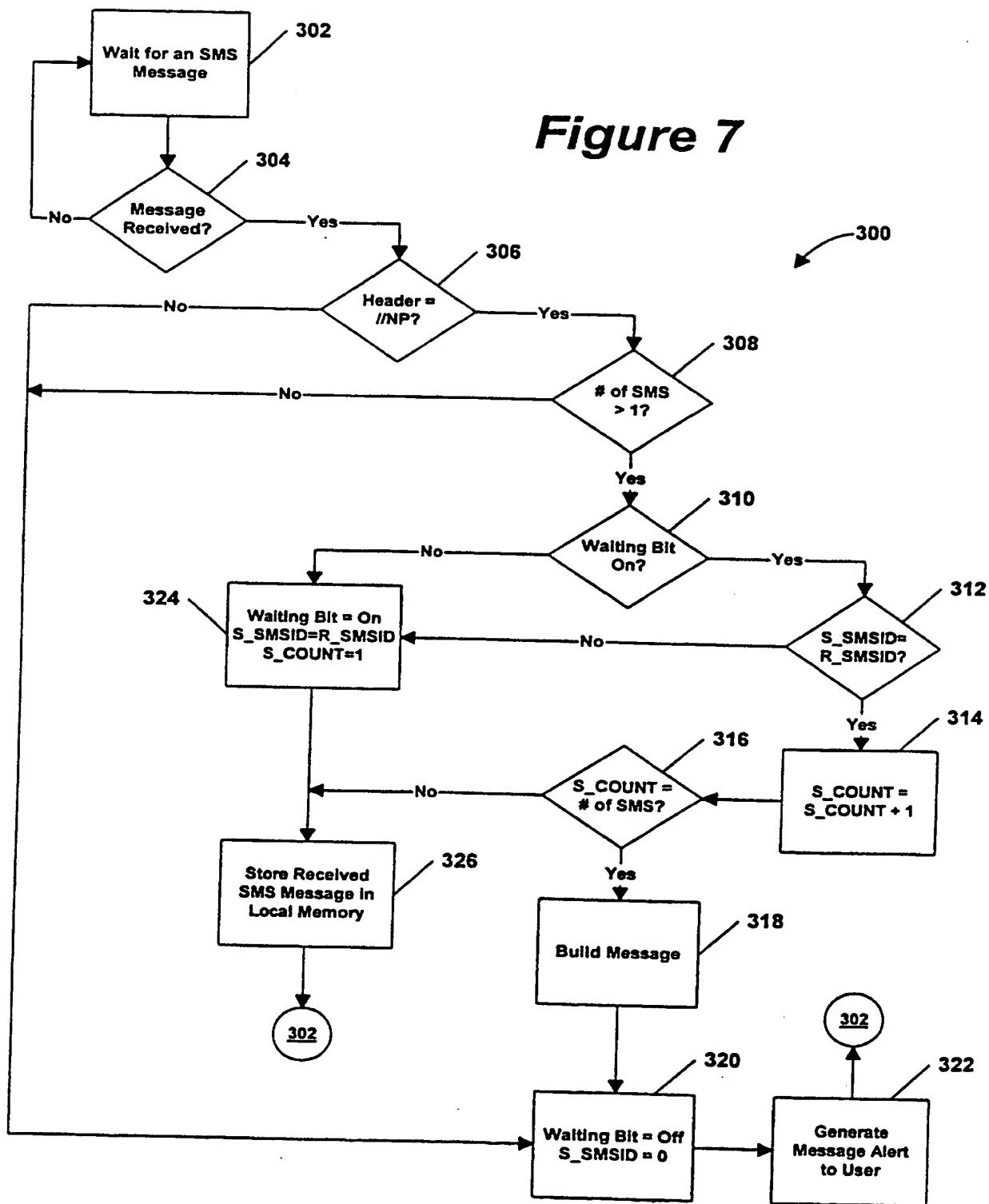
INTERNATIONAL SEARCH REPORT

	International application No.
	PCT/US00/24643

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) : H04Q 7/20; H04L 1/00
US CL : 455/466, 412; 370/230, 236
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S. : 455/466, 412; 370/230, 236; 395/200.17; 340/825.44
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched NONE
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,311,516 A (KUZNICKI ET AL) 10 MAY 1994, COLUMN 14, LINE 62 - COLUMN 19, LINE 63	1-5
Y	US 5,708,781 A (CHIASHI ET AL) 13 JANUARY 1998, see entire document.	1-5
Y	US 5,784,000 A (SATO) 21 JULY 1998, see entire document.	1-5
Y	US 5,884,140 A (ISHIZAKI ET AL) 16 MARCH 1999, FIGURE 6A	1
Y, P	US 6,108,530 A (AYABE ET AL) 22 AUGUST 2000, see entire document.	1-5

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"P"	document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 November 2000 (05.11.2000)	2 8 DEC 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Reinhart Eisenzopt Telephone No. 703-305-3900
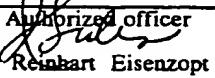
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